

Succinea ovalis Say. Lark Harbor, Savage Cove, Flower Cove, Eddie's Cove, St. John's Island, Bard Harbor Hill, Doctor Hill.

Succinea avara Say. Sandy Cove, Cape Norman, Yankee Point, Four Mile Cove, Big Brook, St. John's Island, Flower Cove, Back of Savage Cove, Savage Point.

Succinea verrilli Bld. Anchor Cove, Flower Cove, Bard Harbor Hill, St. John's Island.

Lymnæa palustris Müll. Cook Point, Pistolet Bay; Schooner Island; Sandy Cove; Flower Cove; Otter Pond near Plum Point; Brig Bay; Eddie's Cove; Boat Harbor; Big Brooks; Savage Point; St. John's Island.

Physa gyrina Say. Otter Pond near Plum Point, Brig Bay.

Planorbis parvus Say. Otter Pond near Plum Point, East Brook at St. Barbe Bay, Eddies Cove Brook.

Valvata lewisii Curr. Eddies Cove Brook.

Sphaerium occidentale Prime. Otter Pond near Plum Point.

Anodonta marginata Say. Otter Pond near Plum Point.

DESCRIPTIONS OF NEW FORMS OF PLEISTOCENE LAND MOLLUSKS
FROM ILLINOIS WITH REMARKS ON OTHER SPECIES

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The study of a large amount of material from loess deposits of Illinois, collected by members of the State Geological Survey of Illinois, has revealed some forms which appear to need recognition either as species or varieties. The modern study of paleontology has drawn rather more closely the limits of specific and varietal differentiation than has been thought desirable previously, but the recognition of the faunas of minor horizons has necessitated such procedure for the purpose of identifying the strata by the presence of characteristic variations which are

¹Contribution from the Museum of Natural History, University of Illinois, No. 42.

constant, though of minor extent in comparison with variations as found in many recent species. Such minor variations have been noted among loess fossils from Illinois and adjacent states, and it is important from the standpoint of the discrimination of interglacial intervals and their variations in time, that these apparently trivial modifications should be recognized. My thanks are due Dr. M. M. Leighton, Chief, Illinois Geological Survey, for the opportunity of studying the collections made by the Survey.

POLYGYRA HIRSUTA YARMOUTHENSIS NOV. VAR.

Shell differing from recent *hirsuta* in being uniformly smaller, with a straighter parietal lamina which is shorter than in the typical form, the denticle on the peristome is smaller, the base of the shell not usually as convex, and the basal callus is not as heavy.

H. 4.2; D. 6.6 mm. Type.

H. 4.1; D. 6.5 mm. Paratype.

H. 4.5; D. 6.8 mm. Shawneetown Hill loess.

Type locality: Clark Co., Ill., 3 miles southwest of Marshall, in loessal silt. Types: Museum Natural History, Univ. Ill., P2085; Acad. Nat. Sci. Phila., 142707.

Distribution: *Yarmouthensis* occurs in the loess deposits of Illinois, western Indiana (New Harmony and Mt. Vernon) and eastern Iowa. Material is not at hand to determine its exact distribution in Iowa. Stratigraphically it is known from Yarmouth to early Wisconsin time.

Remarks: This form of *hirsuta* is uniformly different from the large shell so abundant in Illinois and Indiana at the present time. Its smaller size (less than 7 mm. diameter) will always distinguish it from the recent form (8–8.5 mm. diameter), besides which the aperture armature is weaker and the base less convex. Specimens from Shawneetown (late Wisconsin) are larger than material from earlier interglacial deposits, indicating a variation toward the recent form. It differs from *pilula* Pilsbry in the form of the basal notch and in its more depressed spire. A small form found in Pennsylvania and other eastern localities is quite similar in form and may be

more closely related than the large form now living in the same region. It differs from *yarmouthensis* in its stronger lip armature and generally more convex base, more globular form and narrower aperture. The eastern form should probably be distinguished as a geographic race.

POLYGYRA MONODON PEORIENSIS NOV. VAR.

Shell differing from typical *monodon* in being smaller, with a smaller umbilical opening, a less elevated parietal lamina which is usually joined to the basal lip near the columella by a more or less well-developed callus.

H. 3.9; D. 6.1 mm. Type.

H. 4.1; D. 6.0 mm. Paratype.

H. 3.5; D. 5.6 mm. Paratype.

H. 5.0; D. 7.0 mm. Adams Co., Curtis Creek.

Type locality: Adams Co., Ill., Municipal quarry near Quincy, Peorian loess. Types: Museum Natural History, Univ. Ill., P1910a; Acad. Nat. Sci. Phila., 142708.

Distribution: This variety has been seen from Yarmouth to Peorian time. It occurs in Bureau, Adams, and Clark Co., Ill., and at Mt. Vernon, Indiana. The latter is believed to represent Sangamon time.

Remarks: This variety of *monodon* is uniformly smaller than most recent forms and has a smaller umbilicus and less well-developed denticles in the aperture. Most recent specimens have a maximum diameter of 8 to 9.3 mm. Specimens from Mercer Co., Ill., range from 7.5 to 8 mm., while the smallest specimens seen are from Arlington, Indiana, and measure 7 mm. in diameter. These small forms differ from the fossil variety in having a larger umbilical opening and a more massive and higher parietal lamina. Loess specimens from Mt. Vernon, Ind., measure 4.3 by 7 mm., and have a higher spire than the Arlington specimens. There is some variation in size among the loess material, but all have the small umbilical opening and weaker parietal lamina.

CIRCINARIA CONCAVA (Say).

A few specimens from the loess of Mt. Vernon, Posey Co., Ind., are smaller and have a more ovate, less rounded aperture than recent forms from Illinois and Indiana, but not enough material is at hand to determine whether this is a geologic race or individual variation. There is great probability that it may be a geologic variation, as in the other forms discussed.

ANGUISPIRA ALTERNATA (Say).

Specimens from Sangamon and Peorian strata average smaller than material from later intervals and the recent fauna, the former having a maximum diameter of 17-17 mm. while the latter run 20-25 mm. The earlier forms are also slightly higher in the spire. More material is needed from loess deposits.

GONYODISCUS SHIMEKII (Pilsbry).

An examination of a large collection of this small species conclusively proves that it is not the same as *cockerelli* Pilsbry, having one more whorl (*shimekii* $5\frac{1}{2}$, *cockerelli* $4\frac{1}{2}$), a larger size (*shimekii* 7 mm, *cockerelli* 6.1 mm. diam.), and coarser striae. Comparisons have been made with *cockerelli* from Colorado, Arizona and New Mexico, mostly identified by Pilsbry. *Cockerelli* is to be considered the descendant of *shimekii* and by students of recent mollusks may be classed as a variety of *shimekii*, but for geological purposes it had best be considered a distinct species. It is apparently a horizon marker, having been found in Illinois only in strata of Peorian age. In Iowa, however, Shimek has recorded it from Yarmouth deposits in Harrison, Monona and Pottawattamie counties (see Baker, Life of Pleistocene, p. 256). In the light of the studies of Alden and Leighton, however, on the Iowan loess (An. Rep. Geol. Surv. Iowa, XXVI, pp. 49-212, 1917) these and other Iowan deposits may be found to be of Peorian age.

SUCCINEA OVALIS PLEISTOCENICA NOV. var.

Shells differing from typical *ovalis* in having a rounder aperture and comparatively longer spire; it averages somewhat smaller than the *ovalis* now living in Illinois.

L. 19.0; D. 11.5; Ap. L. 11.5; D. 8.0 mm. Type.

L. 17.2; D. 10.0; Ap. L. 10.-; D. 5.5 mm. Paratype.

L. 16.0; D. 9.0; Ap. L. 9.0; D. 6.0 mm. Paratype.

L. 15.0; D. 9.3; Ap. L. 9.4; D. 6.5 mm. Paratype.

L. 11.5; D. 7.0; Ap. L. 7.8; D. 4.9 mm. Paratype.

Type locality: Clark Co., 3 miles southwest of Marshall, in loessal silt of Yarmouth age. Types: Museum of Natural History, Univ. Ill., P2088a; Acad. Nat. Sci. Phila. 142710.

Distribution: Clark Co. (Yarmouth); Near Alton, Madison Co. (Sangamon); Near Alton, Madison Co., Mercer, Warren, Rock Island, Bureau, Peoria, Union Co. (Peorian). Also in Peorian loess at Freeport, Iowa. Probably the Iowan records of *ovalis* refer to this form.

Remarks: This variation of *Succinea ovalis* is abundant in the loess deposits of Illinois and Iowa and differs sufficiently and constantly enough for recognition as a variety of the recent form. It was apparently characteristic of the dry conditions under which the loesses were deposited. Immature specimens have been identified as *Succinea grosvenori*, from which they differ in the wider aperture and shorter spire. Some forms somewhat resemble *Succinea ovalis chittenangoensis* Pilsbry, from New York State, but the fossil form has a shorter spire and more rounded aperture than that variety (see Pilsbry, Proc. Phila. Acad., 1908, p. 50). *Pleistocenica* has not been observed from strata later than Peorian. The shorter, wider aperture is its chief characteristic, specimens of the fossil and of the recent form of the same size having the following comparative measurements:

Pleistocenica, L. 19; H. 11.5; Ap. L. 11.5; D. 8.0 mm.

Recent *ovalis*, L. 18.5; D. 11.1; Ap. L. 13.2; D. 8.0 mm.

SUCCINEA GROSVENORII GELIDA NOV. VAR.

Shell small, elongated, rather narrow; whorls $3\frac{1}{2}$, convex, separated by deep sutures, last whorl comparatively small, flat-sided, or but slightly convex; spire long, acute; aperture rounded, about half as long as shell; columella straight curving into the parietal wall in a gentle curve, not forming a distinct

angle; there is a slight callus which is spread over the parietal wall; sculpture of rather fine, vertical striae.

L. 8.0; D. 4.2; Ap. L. 4.0; D. 2.4 mm. Type.

L. 7.3; D. 4.0; Ap. L. 3.5; D. 2.3 mm. Paratype.

L. 6.8; D. 4.5; Ap. L. 3.7; D. 2.2 mm. Paratype.

L. 6.6; D. 3.3; Ap. L. 3.1; D. 2.0 mm. Paratype.

L. 7.4; D. 4.1; Ap. L. 3.7 mm. Paratype.

Type locality: Boone Co., one-half mile northwest of depot at Irene, in Peorian loess. Types: Museum Nat. Hist. Univ. Ill., P875a; Acad. Nat. Sci. Phila., 142712.

Distribution: Bureau Co. (Yarmouth); Boone Co. (Sangamon); Mercer, Warren, Whiteside, Bureau, Boone, Rock Island, Adams, Carroll, Ogle, Stephenson, Madison (Peorian); Bureau, Tazewell, Gallatin Co. (Early Wisconsin); Henry Co. (Late Wisconsin). It is most abundant in the Peorian interval, common in early Wisconsin time, and rare in late Wisconsin. It is not abundant, apparently, in Yarmouth or Sangamon time.

This small Succinea has been identified as *grosvenori*, *avara*, and *vermeta*, and certain specimens resemble each of these species. In the paper in Journ. Geol., XXX, pp. 44-56, the writer referred the form to *vermeta* Say, a variety of *avara*. It is not this form, however, being smaller, with a rounder aperture and a relatively longer spire. It appears to be most nearly related to *grosvenori* Lea, the fossil resembling certain small or young specimens of that species. The aperture is, however, smaller, rounder and less elongated, and the shell is much narrower, besides being only about half the size of adult *grosvenori*. Comparisons have been made with specimens from Arizona and Colorado identified by Pilsbry. This same form was reported as *verrilli* Bland by early Iowan geologists and the shell, in many of its forms, does resemble Binney's figure of this species. True *grosvenori* is reported from the Iowa loess by Shimek, but none have been seen from Illinois. *Gelida* occurs in the Iowan loess and some of the Iowa records of *grosvenori* may have been based on this form.

POMATIOPSIS SCALARIS NOV. sp.

Shell elongated, turreted, scalariform; spire long, scalar; sutures deeply impressed; whorls about 8, very convex, the body whorl disproportionately larger than the preceding whorl; umbilicus round, wide, deep; aperture roundly oval, peristome thin, continuous, the inner lip forming a rounded, erect border near the umbilicus.

L. 7.8; D. 3.5; Ap. L. 2.1; D. 1.6 mm. Type.

L. 7.2; D. 3.5; Ap. L. 2.2; D. 1.8 mm. Paratype.

L. 7.1; D. 3.5; Ap. L. 2.1; D. 1.6 mm. Paratype.

L. 7.5; D. 3.4; Ap. L. 2.2 mm. Paratype.

Type locality: New Harmony, Posey Co., Indiana, in Peorian loess. Types: Mus. Nat. Hist. Univ. Ill., P2321; Acad-Nat. Sci. Phila., 142713.

Distribution: Clark Co., 3 miles southwest of Marshall, in loessal silt (Yarmouth); Posey Co., Ind., in loess (Peorian).

Remarks: This *Pomatopsis* is very abundant in the loess of the Wabash River, particularly at New Harmony. It has previously been identified as *lapidaria* (Fuller and Clapp, Bull. Geol. Soc. Amer., XIV, p. 162, 1903; Daniels, NAUTILUS, XIX, p. 63, 1905), but differs markedly from that species, which is abundant in the recent fauna of Indiana and Illinois. The whorls are shorter and wider, more convex, the sutures more deeply impressed, there is one more whorl, the umbilicus is rounder, wider, and deeper, the aperture is rounder and the body whorl is larger than the preceding whorl. The differences are so marked that the form must be regarded as a distinct species, though it is probably ancestral to the living *lapidaria*. True *lapidaria* has been collected in the loess-like clay of late Wisconsin age in Stephenson Co., Ill., associated with *Helicodiscus parallelus* and *Galba obrussa*, the *lapidaria* being exactly like the form living today in Illinois. *P. scalaris* has not been seen in deposits later than Peorian.